

**Appl. No.** : **10/804,891**  
**Filed** : **March 19, 2004**

### **REMARKS**

Claim 1 has been amended to include the limitations of claims 5 and 6 and to limit the electrode active material. Support can be found on page 2, lines 19-24, for example. Claim 11 has been amended to include the limitations of claims 6 and 14 and to limit the proton-conducting particles. Support can be found on page 2, lines 14-18, for example. Accordingly, claims 5, 6, and 14 have been canceled. Claims 24-31 have been added. Support can be found on page 2, lines 24-26, for example. The specification has been amended to correct a clerical error. No new matter has been added. Applicant respectfully requests entry of the amendments and reconsideration of the application in view of the amendments and the following remarks.

#### **Correction of Specification**

As suggested in the office action, "cell" has been added after "electrochemical" in page 1, line 7.

#### **Rejection Under 35 U.S.C. § 102**

Claims 1-3, 6-12, 15-17, 20-23 are rejected under 35 U.S.C. § 102(b) as being anticipated by Ohsawa (5,225,296). Claims 1 and 11 are independent. Claim 1 has been amended to include the limitations of claims 5 and 6 and to limit the electrode active material. Claim 11 has been amended to include the limitations of claims 6 and 14 and to limit the proton-conducting particles. Claims 5, 6, and 14 have been canceled. Because claim 1 recites the limitations of claim 5 which has not been rejected on this ground, and claim 11 recites the limitations of claim 14 which has not been rejected on this ground, claims 1 and 11 could not be rejected on this ground. Thus, at least for this reasons, the remaining dependent claims also could not be rejected on this ground. Applicant respectfully requests withdrawal of this rejection.

#### **Rejection Under 35 U.S.C. § 103**

Claims 4-5, 13-14, 18-19 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Ohsawa. Claims 1 and 11 are independent and have been amended as described above. Applicant respectfully traverses this rejection.

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First, with regard to claim 1, the Examiner asserts: "Ohsawa et al. disclose an electrode comprising a porous conductive substrate (abstract) as well as an electrode active material (col. 8: 17-28) and a conductive auxiliary (col. 6:65-col. 7:2) filled in the pores in the substrate (col. 8:66-col. 9:1)." (Emphasis added.) However, Ohsawa states:

"In addition, as required, fillers such as alumina, silica, talc, carbon black, black lead, .... may be added to the dispersion medium for the phenolic resin used to impregnate the sheet made from the cured phenolic resin fabric. .... After drying, heat and pressure is applied to cure the uncured heat-curable phenolic resin adhering to the cured phenolic resin fabric. .... Next, the resulting porous composite sheet is calcined in an oxygen-free atmosphere .... to form a porous carbon sheet." (col. 6, line 65 to col. 7, line 23; emphasis added.)

As is clear from the above, in Ohsawa, the fillers are added to a dispersion medium, and the sheet (which is not a porous carbon sheet) is impregnated with it, followed by calcining the resulting composite sheet to form a porous carbon sheet. Thus, clearly, the fillers are used to form the porous carbon sheet itself and constitute the porous structure itself. The fillers are not filled in the pores in the conductive sheet. Thus, the Examiner errs in understanding that the fillers in Ohsawa are filled in the pores in the conductive substrate. At least for this reason, the rejection could not be maintained.

Second, in claim 1, because the conductive auxiliary is filled in the pores in the conductive substrate, contact areas between the electrode active materials, between the conductive auxiliaries and between the electrode active material and the conductive auxiliary, are substantially maximized. Thus, an electrode with a low resistivity can be provided and electron conductivity can be significantly improved. (Page 13, line 23 to page 14, line 4, for example) The above features are not taught by Ohsawa.

Third, Ohsawa discloses use of electroconductive polymers for electrode active material such as polyacetylene, polypyrrole, polyaniline, polyazulene, polyphthalocyanine, poly-3-methylthiophene, polypyridine, polydiphenyl-benzidine, and their derivatives (col. 8, lines 17-28). The above polymers are not indole  $\pi$ -conjugated compounds, quinones, or quinone polymers. In contrast, claim 1 as amended herein use as proton-conducting compounds for electrode active material indole  $\pi$ -conjugated compounds, quinones, or quinone polymers, which are not taught or even suggested by Ohsawa.

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Fourth, as discussed above, because the configuration of the electrode of claim 1 is structurally distinct from that of Ohsawa, one of ordinary skill in the art could not modify the structure using "a ratio of the conductive auxiliary to the electrode active material being 50 % by weight or less" recited in claim 1.

In view of the foregoing, not all limitations of claim 1 are taught or suggested by Ohsawa because Ohsawa does not teach or suggest the recited structure including the conductive auxiliary and the recited electrode active material. In addition, Ohsawa does not teach or suggest the advantages according to claim 1. Accordingly, claim 1 cannot be *prima facie* obvious over Ohsawa. At least for this reason, the dependent claims also cannot be obvious over Ohsawa.

Claim 11 recites limitations similar to those discussed above. Thus, at least for the same reason, claim 11 and its dependent claims cannot be obvious over Ohsawa.

Applicant respectfully requests withdrawal of this rejection.

#### New claims

Claims 24-31 have been added. Claims 24, 26, 28, and 30 are independent and recite limitations similar to those in claim 1 or 11, except for the electrode active material. Claims 24 and 26 recite "poly-p-phenylene, polyphenylene-vinylene, polyperinaphthalene, polyfuran, polyflurane, polythienylene, polypyridinediyl, polyisothianaphthene, polyquinoxaline, polypyrimidine, polyindole, polyaminoanthraquinone, polyimidazole, and derivatives of the foregoing," which are not taught or suggested by Ohsawa. Claims 28 and 30 recite "proton-conducting polymers obtained by copolymerizing multiple monomers constituting different polymers or compounds selected from the group consisting of  $\pi$ -conjugated polymers, indole  $\pi$ -conjugated compounds, quinones, and quinone polymers," which are not taught or suggested by Ohsawa. Thus, as with claims 1 and 11, these claims and their dependent claims also cannot be obvious over Ohsawa.

#### CONCLUSION

In light of the Applicant's amendments to the claims and the foregoing Remarks, it is respectfully submitted that the present application is in condition for allowance. Should the Examiner have any remaining concerns which might prevent the prompt allowance of the

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application, the Examiner is respectfully invited to contact the undersigned at the telephone number appearing below.

Please charge any additional fees, including any fees for additional extension of time, or credit overpayment to Deposit Account No. 11-1410.

Respectfully submitted,

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